Amendments to the Specification:

Please replace paragraph [0002] with the following paragraph:

[0002] Fixed pattern noise (FPN) is an unwanted signal component that may be constant or slowly changing with time, but might vary spatially. ~~fixed~~ Fixed pattern noise may be generated in images captured with a CMOS sensor and other image pick-up devices, including those mounted on vehicles. It is desirable to remove fixed pattern noise.

Please replace paragraph [0005] with the following paragraph:

[0005] In accordance with one aspect of the present invention, an image processing device is provided ~~to~~ for removing fixed pattern noise in images captured by image pickup device mounted on a vehicle. The image processing system includes a memory on which is stored multiple images captured by the image pickup device while the vehicle is running; and a controller adapted to generate correction data by extracting the high spatial frequency components from portions of the stored images[[,]] and to use the correction data to remove fixed pattern noise from images captured by the image pickup device.

Please replace paragraphs [0026] through [0028] with the following three paragraphs:

[0026] Camera 101 has, e.g., a CMOS sensor as the image pickup element, and, when movement of the vehicle itself is detected based on the output from vehicle speed sensor 105, images in front of the vehicle are captured consecutively at a prescribed time interval Δt. The images captured during operation of the vehicle are displayed on monitor 104, and, at the same time, they are output to image memory 102[[,]] and are stored as stored images ~~to be~~ as explained later. In this case, a fixed pattern noise (FPN) is usually generated in images captured with a CMOS sensor. Consequently, it is necessary to remove such noise. As will be explained later, controller 103 extracts FPN correction data from the images stored in image memory 102 to perform FPN correction to remove the noise.

[0027] Controller 103 reads the stored images from image memory 102. For the stored

images, while the vehicle is operation, the images in front of the vehicle captured consecutively by camera 101 at a prescribed time interval are superimposed and stored. As shown in Figure 2, the images have an unclear shape or contour, that is, the images are blurred. A region divided in the horizontal direction for the images of the stored images 2b is set as lateral line 2c. The lateral line 2c has a height of a prescribed number of pixels, such as 1 pixel, in the image vertical direction. ~~Figure 3 is a diagram~~ Figures 3A-3C are diagrams illustrating the results of the luminance output value at the positions of the various pixels in the horizontal direction in the region on stored images 2b surrounded by the lateral line 2c.

[0028] As shown in Figure ~~3(a)~~ 3A, in the graph illustrating the characteristics of the luminance output value with respect to the pixel position in the horizontal direction on lateral line 2c, usually, the high frequency component as indicated by symbol 3a is detected at a prescribed pixel position due to generation of FPN. In the lateral line 2c, if FPN is not generated, because stored images 2b are blurred images, they are images free of a high spatial frequency component, and they are expected to have the characteristics shown in Figure ~~3(b)~~ 3B. In consideration of this fact, for the characteristics of the luminance output value with respect to the pixel position in the horizontal direction of lateral line 2c shown in Figure ~~3(a)~~ 3A, when a high pass filter (HPF) is applied to extract the high spatial frequency component in lateral line 2c, as shown in Figure ~~3(c)~~ 3C, it is possible to extract only the FPN component with respect to the pixel position in the horizontal direction of lateral line 2c.

Please replace paragraph [0037] with the following paragraph:

[0037] Then, only in the computed storage time[[,]] are the images stored in image memory 102, and, based on the stored images obtained in this case~~, in the first embodiment~~, the FPN correction data are computed and FPN correction is executed for the images as explained above with respect to the first embodiment. Regarding the block diagram shown as Figure 1, the specific example of the stored images shown in Figure 2, and the actual example of the graph showing luminance output values at the various pixel positions in the horizontal direction in lateral line 2c shown in ~~Figure 3~~ Figures 3A-3C, the state is the same as that in the first

embodiment, so their explanation will not be repeated.

Please replace paragraph [0049] with the following paragraph:

[0049] Figure 6 is a block diagram showing the construction of an embodiment of a vehicle-mounted image processing device in a third embodiment. In Figure 6 the same symbols are assigned for the same components as those in Figure 1 for the first embodiment and the explanation will emphasize the differences. Vehicle-mounted image processing device 100 is provided with wiper controller 106 that controls operation of the vehicle wipers and counter memory 107 that stores the count value for the pixel count explained below. Here, the actual examples of graphs showing the luminance output values at each pixel position in the horizontal direction on the lateral line shown in ~~Figure 3~~ Figures 3A-3C are the same as the first embodiment, so their explanation is omitted.

Please replace paragraph [0053] with the following paragraph:

[0053] Note that ~~Figure 7 shows~~ Figures 7A-7C show an actual example of the entire process for normalizing the extracted edges to obtain edge images. That is, line thinning is performed for the edges obtained by binarization shown in Figure ~~7(a)~~ 7A to obtain the edge after line thinning shown in Figure ~~7(b)~~ 7B. Then the thinned edge is expanded to produce a fixed-width in the edge as shown in Figure ~~7(c)~~ 7C.

Please replace paragraph [0058] with the following paragraph:

[0058] From Formula (4), it can be seen that the speed of the object in the images is inversely proportional to distance Z from the focal position of camera 101 to the object present in the images and is proportional to the speed of the object in real space. For example, consider when wall 8a, another vehicle 8b moving forward in front of this vehicle[[,]] and wiper 8c are present in the picked-up image as shown in Figure 8. In this case, the distance from the focal position of camera 101 to the other vehicle 8b is 10 m, ~~its~~ the other vehicle's speed in real space is 100 km/h (≈ 27 m/sec) and the distance from the focal position of camera 101 to wiper 8c is

10 cm. Assuming the speed in real space to be 1 m/sec, from Formula (2), the speed of movement v1 of the other vehicle 8b based on the images and the speed of movement v2 of wiper 8c based on the images are calculated by following Formulas (5) and (6).

$$v1 = 27/10 = 2.7 \cdots (5)$$
$$v2 = 1/0.1 = 10 \cdots (6)$$

Please replace paragraph [0060] and [0061] with the following two paragraphs:

[0060] By continuing to store the area extracted from the frames in which the wiper appears in this way superimposed in image memory 102 as described above, a uniform black image can be obtained as stored image 9a as shown in Figure 9. Specific pixels, for example, lateral line 9b that has a height of 1 pixel, are set for the image vertical direction for stored image 9a just as in the first and second embodiments. Stored image 9a, which is a uniform black image, is an image corresponding to the stored image 2b in the first and second embodiments, that is, a blurred image, so that calculating the luminance output value at each pixel position in the horizontal direction in the area on stored image 9a enclosed by lateral line 9b will be as shown in ~~abovementioned Figure 3~~ Figures 3A-3C.

[0061] Therefore, by applying a high pass filter (HPF) to the luminance output value characteristics for a pixel position in the horizontal direction on lateral line 9b shown in Figure ~~3(a)~~ 3A and extracting the high spatial frequency component within lateral line 9b just as in the first embodiment, only the FPN component for a pixel position in the horizontal direction within lateral line 9b can be extracted as shown in Figure ~~3(c)~~ 3C.

Please replace paragraph [0069] with the following paragraph:

[0069] In the fourth embodiment, the FPN correction data computed as described in the first through third embodiments are used to correct the offset of the various pixels and the scattering of the gain of the images captured consecutively with camera 101. Regarding a specific example of the stored images and a specific example of a graph illustrating the luminance output

value at the various pixel positions in the horizontal direction in lateral lines 2c and 9b as shown in Figures 2, ~~3~~ 3A-3C and 9, they are the same as that in the first through third embodiments, and will not be explained again.